REMARKS

Applicant's undersigned counsel again thanks Examiner Jolley for her careful and thorough examination of the present application. Applicant also acknowledges and appreciates the rejoinder and examination of claims 8-13 in the present application, as well as the withdrawal of the art-based rejections over Kim and Thakur.

Herein, the claims have been amended to overcome Section 112, second paragraph indefiniteness rejections, as well as a claim objection based on 37 CFR § 1.75(c) as set forth more fully below. Claims 6 and 13 have been amended to change their respective dependencies. No new matter has been entered; basis for all claim amendments can be found in the set of claims previously pending. Claims 2 and 14 have been canceled without prejudice.

Claims 2-3 have been objected-to under 37 CFR § 1.75(c) as being of improper dependent form for failing to further limit the antecedent claim. Claim 2 has been canceled, rendering the objection moot. The objection of claim 3 is believed to be overcome in view of the amendments to claims 1 and 3 herein.

Claims 4-5, 11 and 13 have been rejected under 35 USC § 112, second paragraph as being indefinite. With respect to claims 4-5 and 11, the rejections stem from an apparent contradiction between the independent claim and certain dependent claims. As amended, it is believed any contradiction has been removed, and the rejection overcome. With respect to claim 13, this claim has been amended to depend from claim 10 to overcome the rejection.

Claim 14 has been rejected under 35 USC § 102(b) as being anticipated by Shirley. Claim 14 has been canceled, thus rendering the rejection moot.

Claim 1 has been rejected under 35 USC § 102(b)/103(a) as being either anticipated by or obvious over Shirley. For the following reasons, this rejection is respectfully traversed.

The Examiner has kindly acknowledged that in claim 1 the coating liquid is already applied on the substrate prior to thermally conditioning. Indeed, it is the *viscous liquid* in claim 1 that is to be thermally conditioned by the recited thermal source. The Examiner has advanced two arguments in view of Shirley, contending the claimed method to be obvious. Each is discussed below and addressed in turn.

The first argument acknowledges that Shirley discloses separate mechanisms for the chill plate assembly 20 and the coater bowl assembly 30. It is in the former where Shirley discloses the orifices 55a, which direct heated or cooled gas to the substrate 70, can be located *above* the substrate. But it is in the *latter* where a liquid coating is applied to the substrate. The chill plate 20 is where the substrate *itself* is thermally conditioned, absent a liquid coating thereon, before being transferred to the coater bowl 30 to be coated with a liquid. Hence, ("most often" as stated by the Examiner), the chill plate is used to heat or cool the substrate prior to liquid coating. However, the Examiner cites col. 3 lns. 27-29, to suggest the chill plate assembly *also* can be used in Shirley to condition the substrate after coating a "primer" thereon. The entire paragraph from Shirley containing that passage is reproduced below:

> In one embodiment, the chill plate assembly 20 can be configured to transfer heat to and/or from the substrate 70. For example, the chill plate assembly 20 can cool the substrate 70 after the substrate 70 receives a coating of primer in a high temperature process. Alternatively, the chill plate assembly 20 can be used to heat the substrate 70, or to heat one portion of the substrate 70 while cooling another portion. Accordingly, the plate temperature controller 50a can include a fluid supply 51a coupled with conduits 53a to manifolds 54a positioned proximate to the substrate 70. The manifolds 54a can include nozzles having orifices 55a facing the substrate 70. The fluid supply 51a can direct temperature-controlled fluid to the manifolds 54a and through the orifices 55a to form fluid streams or jets. The fluid streams or jets can impinge on a back side 71 of the substrate 70 to provide a plurality of thermal links between the plate temperature controller 50a and the substrate 70.

Shirley, col. 3 lns 24-41.

As can be seen from the quoted paragraph, even when referring to the case where a "primer" has already been applied, the orifices 55a in the chill plate assembly 20 are directed:

"to heat the ***substrate*** 70," or

to "heat one portion of the ***substrate*** 70 while cooling another portion," or

to emit "fluid streams or jets [that] impinge on a back side 71 of the ***substrate*** 70," or

"...to provide...thermal links between the plate temperature controller...and the *substrate* 70."

Hence, it will be seen that even in the context of a substrate that has been provided with a "primer," it is *the substrate* that is conditioned (heated or cooled) via the orifices 55a, *and not* the applied "primer." This is most evident from the quoted passage itself, wherein it indicates that the fluid streams or jets impinge "on the back side of 71," i.e. the side opposite to where the "primer" would have been applied. Shirley never hints at conditioning the applied "primer" for any reason, such as to influence its viscosity. Furthermore, there is no indication that such a "primer" would have been applied in a liquid state, or if so, that it would still be liquid when placed in the chill plate assembly 20. Shriley did not intend, and does not disclose, conditioning a liquid "primer" layer using gas from the nozzles 55a in the chill plate assembly 20. A "primer" as mentioned in Shirley at col. 3 lns 27-28 typically would not be a viscous layer requiring viscosity manipulation, if a liquid at all.

It is noted that col. 4 lns. 28-30 state that the transfer device 40 can be operated to move a substrate 70 "from a *vapor deposition chamber* (not shown) to the chill plate assembly 20 for cooling." But a coating (such as a "primer") applied through vapor deposition would not be in a liquid state. Shirley never teaches or indicates "conditioning [a] *liquid* on the substrate thermally, to influence its viscosity" using a thermal source above the substrate surface as recited in claim 1.

Shirley consistently and uniformly refers to controlling or generating a temperature distribution *in the substrate*, and **not** in a viscous liquid applied to the surface of the substrate. It is the direct conditioning and viscosity manipulation of a viscous liquid using a thermal source located above the substrate that is described in claim 1. This feature is not evident from the chill plate assembly 20 in Shirley, even in the case where a "primer" is first applied to the substrate. For these reasons, it is respectfully submitted that the Examiner's first argument to suggest that Shirley renders claim 1 obvious is incorrect.

The second argument advanced by the Examiner is that the orifices 55b (and associated manifolds 54b, heat exchangers, etc.) in the coater bowl assembly 30 can be located *above* the substrate instead of below it. The Examiner has cited col. 10 lns.

10-14 to support this proposed modification. The entire paragraph from Shirley containing that passage, and the one before it, are reproduced below:

> The bowl temperature controller 50b is coupled to the coater bowl assembly 30 to transfer heat to or away from the substrate 70 as the substrate 70 rotates relative to the coater bowl 31. *In one embodiment, the temperature controller 50b includes a fluid supply 51b coupled to a single heat exchanger 52b which is in turn coupled with a conduit 53b to a single manifold 54b. The manifold 54b includes a plurality of orifices 55b disposed in a concentric, annular arrangement* about the rotatable chuck 32 to transfer heat to or from the substrate 70.
>
> The heat transferred to or from the substrate 70 can be controlled by adjusting the flow rate through each of the orifices 55b. For example, the orifices 55b toward the periphery of the substrate 70 can be smaller than those toward the center of the substrate 70 to reduce the rate of heat transfer to or from the periphery of the substrate 70. Alternatively, each of the orifices 55a can have a variable diameter that can be adjusted manually or via an actuator to direct the flow at a selected flow rate through each orifice 55a. *In another embodiment, the bowl temperature controller 50b can include a plurality of heat exchangers 52b and manifolds 54b, arranged in a manner generally similar to that discussed above with reference to the plate temperature controller 50a*.

Shirley, col. 4 ln. 58 to col. 5 ln. 14.

The second emphasized portion above is that cited by the Examiner. However, on careful review it is clear this does not imply that the manifold/nozzle/orifice arrangement in the coater bowl assembly 30 can be relocated above the substrate 70 instead of below it. Instead, the cited passage merely describes an alternative to the first embodiment described in the previous paragraph, where "a single heat exchanger 52b" is used, which is "coupled with conduit 53b to a single manifold 54b." In the alternative embodiment quoted by the Examiner, instead of a ***single*** heat exchanger and a ***single*** manifold, "a ***plurality*** of heat exchangers" and a "***plurality*** of manifolds," arranged similarly as in the chill plate assembly 20, can be used.

The passage cited by the Examiner merely indicates that ***pluralities*** of heat exchangers and manifolds can be used in the coater bowl assembly 30, instead of the ***single*** heat exchanger and manifold described in the prior embodiment. There is no reference to changing the *location* of the manifold 54b, orifices 55b, etc., in the coater

bowl assembly 30 from below the substrate 70. In fact, it is evident this *cannot* be done because at least the central nozzle/manifold 53a from the chill plate assembly 20 would interfere with or displace the liquid nozzle 35, which is centrally located above the substrate (see Fig. 1). For the above reasons, it is respectfully submitted that the Examiner's second argument that Shirley renders claim 1 obvious is also incorrect.

In summary, both the arguments advanced by the Examiner to suggest that the method of claim 1 is obvious over Shirley are believed to be incorrect. First, Shirley consistently refers to regulating the temperature of the *substrate*, and never of any liquid coating *on* the substrate. It also is not clear, and actually seems to be the opposite, that any "primer" in Shirley even would be in the liquid state by the time any "primer"-coated substrate made its way into the chill plate assembly 20. Second, there simply is no fair teaching to suggest repositioning the heat/cold gas manifold/nozzle(s), etc. in the coater bowl assembly 30 *above* the substrate instead of below it. Shirley does not suggest doing this, and it is evident that one would not attempt it at least because it would interfere with the liquid nozzle 35.

Shirley contains no fair teaching or suggestion to apply a source of heat or cold *above* a substrate to condition a *viscous liquid* that has been applied to a substrate. This was not the intent of Shirley, and one of ordinary skill in the art would not derive from Shirley any reasonable motivation to do so. In fact, by separating the cooling and liquid-application operations into different procedures to be performed stepwise in separate steps, and even in separate devices, Shirley evinces quite an opposite motivation. Note that Shirley discloses positioning the heating/cooling equipment above the substrate *only in the chill plate assembly 20*. The reference contains no such teaching with respect to the separate coater bowl assembly 30.

Finally, Shirley provides at least one additional teaching that is *contrary* to positioning the manifolds/nozzles etc. above the substrate, where they might act on a deposited liquid as the Examiner has suggested. At col. 6 lns. 1-5, it is disclosed:

> Where the coater bowl assembly 30 dispenses a resist material, the bowl temperature controller 50b can supply a resist solvent through the orifices 55b to prevent the resist from flowing around the periphery of the substrate 70 and collecting on the back side 71 of the substrate 70.

Hence, in the coater bowl assembly 30, another use for the orifices 55b is to dispense a resist-solvent onto the back side 71 of the substrate 70, to prevent liquid resist material coated onto the front side 72 from flowing around the edges of the substrate 70 and sticking to the back side 71. Obviously, this would be impossible if the orifices 55b were relocated *above* the substrate instead of below it. Taken together, this additional feature and the remainder of Shirley clearly suggest one *should not* provide the manifold(s)/orifices above the substrate to condition a *viscous liquid* deposited on the front surface.

For the above reasons, it is respectfully submitted that claim 1 is now in condition for allowance. All remaining claims are dependent claims, and accordingly are believed to be allowable at least for the same reasons as discussed above for claim 1.

Should the examiner have any questions or reservations regarding the instant submission, or for any other reason to expedite the prosecution of this case, she is invited and requested to please contact the undersigned at the phone number below.

Should the Examiner determine that the art-based rejections are to be maintained, she is requested to please indicate that the claim amendments presented herein will be entered for purposes of appeal. The claim amendments made herein are made merely to comply with requirements of the Examiner as well as to cancel claims, thus narrowing the issues and placing the application in better form for appeal.

If there are any fees required by this communication that are not mentioned above, then please charge such additional fees to our Deposit Account No. 16-0820, Order No. 35194US1.

Respectfully submitted,

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